being unpatentable over Go as applied to claims 4, 14, 16, 23 and 26 above, and further in view of well known prior art. Reconsideration of the above-referenced patent application in view of the following remarks is respectfully requested.

Claims 1 and 3-29 are now pending the above-referenced patent application. No claims have been cancelled, added or amended.

Applicants begin with claim 1. Claim 1 recites:

"A video processor system comprising:

a video coder, the video coder including the capability to generate an edge detection map along a predetermined direction for an uncoded frame that is to be coded, wherein said video coder includes the capability to compress the edge detection map, wherein said video coder includes the capability to compress the edge detection map separately from said frame that is to be coded."

According to the Examiner, "Go discloses in columns 14-15, referring to figures 9 and 10, generation (52) and coding (24) of edge detection maps (Sv and Sh) at least along vertical and horizontal directions for an uncoded video frame that is to be coded. The compression (i.e., the coding) of the edge detection maps is done separately from the frame, which is coded by encoder 25. Referring to Figures 11 and 12 in column 15, Go discusses the corresponding video decoding."

It is well-established that in order to establish a *prima facie* case of anticipation under 102 of the patent statute, the Examiner must a provide prior art document that meets each and every element and limitation of the rejected claim. Therefore, even if a single element or limitation is not met by the asserted document, then the Examiner has not succeeded in establishing a *prima facie* case. It is respectfully asserted that Go does not meet at least one element of claim 1. As just an example, the video encoder disclosed in Go performs several additional and differing processing steps not required in claim 1. Go discloses a method of image encoding where the image is sent to an edge detector, and the image is additionally sent to both a filtering process and a down sampling process, resulting in coding and subsequent transmission being performed on representative filtered and down sampled data, rather than on the image. As stated in Column 2, lines 39-47 of Go, "The invented method of encoding a digitized image comprises the steps of: detecting edges in the digitized image; encoding

the position and sharpness of the detected edges to generate edge image information; filtering and down-sampling the digitized image to generate a reduced image; and encoding the reduced image to generate reduced image information." Additionally, in column 5, lines 61-67, "A digitized image X_0 is input from the input terminal 10 to the edge detector 21 and first smoothing filter 22-1. Smoothing filter 22-1 outputs a filtered image X_1 to the next smoothing filter 22-2, and this process continues, each smoothing filter 22-m filtering the image X_{m-1} received from the preceding smoothing filter and furnishing a new filtered image X_m to the next smoothing filter, until the last smoothing filter 22-n is reached. The last smoothing filter 22-n outputs a low-frequency image X_n to a down sampler 23, which outputs a reduced image R to the reduced image encoder 25. The reduced image encoder 25 encodes the reduced image R to obtain reduced image information Cr." Conversely, as illustrated in FIG. 1 of the present application, the frame is coded without performing these additional process steps and the frame is the object that is coded rather than the reduced image R as disclosed in the cited patent. There is no contemplation of requiring a filtering and down sampling process for the frame that is to be coded, and the frame itself is coded in the present application, rather than the reduced image information R, as disclosed in Go. It is, therefore, respectfully asserted that the cited patent does not meet at least one element of claim 1.

Additionally, the methods disclosed for frame and edge information coding as disclosed in reference to claim 1 are materially different than the method disclosed in the Go patent, and the fundamental purpose of edge detection between the rejected claim and the cited patent is materially different. Go discloses a method of edge detection and frame encoding wherein the method used for image decoding is dependent upon the detection and use of edge information in the encoding process. The amount of image information lost in the encoding process makes the edge information necessary in order to properly decode the image information. For example, described in detail in Columns 15 line 24, to Column 16 line 28, is the decoding process that incorporates use of edge information in combination with reduced image information to partially reconstruct an image. The process disclosed in the cited section essentially describes a method of decoding where several edge maps produced during the encoding process are passed through smoothing and down sampling filters, and are then

passed through edge synthesizers to produce several partially reconstructed images of the edges of the original image passed through the encoder. These edge maps, along with the reduced image information, are then supplied to an inverse wavelet transform processor, where the images are added together to produce a decoded image. The image cannot be reconstructed without use of extensive edge information, and the image information transferred is reduced image information R, that provides inadequate image information to fully decode the image.

Conversely, the present application discloses one method of video frame enhancement where video quality improvements may be made on a decoded image by making available to the post-processor reliable signal information about object edges in the video frame. The edge information is not a required component to decoding an image, but is used as optional enhancement information that may be used to varying degrees depending, for example, on the power of the post-processor. As stated on page 12, line 16 through page 13, line 5, "Once the video frame and edge detection map have been decoded, one or more edge detection maps may be employed to make determinations regarding post filtering of the decoded video frame. For example, in one embodiment, a sharpening or high pass filter may be applied on a pixel-by-pixel basis to those pixels indicating edge signal information in the corresponding edge detection map of the video frame. More specifically, in this particular embodiment, if vertical edge signal information is indicated, then a one-dimensional vertical sharpening filter may be applied to the pixel." Additionally, on page 13, line 16 through page 14, line 8 "Furthermore, in an alternative embodiment, the user may select a desired amount of smoothing and/or sharpening and, depending upon the user selection, different amounts of smoothing an/or sharpening may be applied to the video frame based, at least in part, on the edge detection map received and decoded. For example, ... a sliding scale may be implemented in software that provides the user the ability to modify the smoothing and/or sharpening ... the edge signal information may be ignored or different amounts of processing may be employed." The cited passages clearly demonstrate that edge information serves a fundamentally different purpose for the cited patent and the present application, and there appears to be no contemplation of using edge information in the cited patent for the purposes disclosed in the present application. Additionally, the present application is not limited to use

of inverse wavelet transforms as a method of coding. As stated on page 7, lines 9-12, "It will, of course, be appreciated that the invention is not limited in scope to use with any particular form of coding and/or decoding. For example, MPEG-4, H.263+, or any one of a number of other approaches may be employed."

It is, therefore, respectfully asserted that the Examiner has failed to provide prior art document that meets each and every element and limitation of claim 1. It is, therefore, respectfully asserted that claim 1 is in a condition for allowance. Claims 3 and 4 depend from and include all limitations of claim 1, and are, therefore, also in a condition for allowance.

Claim 6 is patentably distinct from Go for the same or similar reasons as claim 1. As just an example, the video processing system of claim 6 is configured to code the edge detection map using any number of coding techniques, several of which are not present in the cited patent. Additionally, as stated previously, the image encoding and decoding method disclosed in Go performed several processing steps on the image information and the edge information that are not required to be performed in the present application. Applicants respectfully refer the Examiner to arguments made concerning the rejection of claim 1 above. It is, therefore, respectfully asserted that the Examiner has not established a *prima facie* case of anticipation under 102 of the patent statute for claim 6, and claim 6 is in a condition for allowance.

Claim 11 is patentably distinct from Go for reasons similar to those of claim 1. As just an example, the video processing system of Go does not disclose a method of edge detection map and video frame decoding where the video frame is not passed through a filtering and/or down sampling process. Applicant respectfully refers the Examiner to the arguments made in regard to claim 1 above. It is respectfully asserted that a *prima facie* case of anticipation under 102 of the patent statute has not been established for claim 11, and claim 11 is in a condition for allowance.

Claims 12-14, 16 and 19 either depend from or otherwise include all limitations of claim 11. It is, therefore, respectfully asserted that these claims distinguish from Go for at least the same reasons as claim 11, and are, therefore, in a condition for allowance.

Claim 20 is patentably distinct from Go for reasons similar to those of claim 1 and claim 11. As just an example, the video processing system of Go does not disclose a method of edge detection map and video frame decoding where the video frame is not passed through a filtering and/or down sampling process. Applicants respectfully refer the Examiner to arguments already presented in reference to claims 1 and 11 above. It is respectfully asserted that a *prima facie* case of anticipation under 102 of the patent statute has not been established for claim 20, and claim 20 is in a condition for allowance.

Claims 21-23 and 26 either depend from or otherwise include all limitations of claim 20. It is, therefore, respectfully asserted that these claims distinguish from Go for at least the same reasons as claim 20, and are, therefore, in a condition for allowance.

The Examiner has rejected claims 5, 15, 17, 24, 25 and 27 under 35 U.S.C. 103(a), as being unpatentable over Go, and further in view of Fan, claim 8 is rejected under 35 U.S.C 103(a) as being unpatentable over Go as applied to claim 6 and further in view of Schreiber, and claims 9, 10, 18, 28 and 29 are rejected under 35 U.S.C 103(a) as being unpatentable over Go as applied to claims 4, 14, 16, 23 and 26 above, and further in view of well known prior art. These rejections by the Examiner are respectfully traversed.

It is well established that in order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, the Examiner must show a suggestion or motivation, either in the references themselves or in knowledge generally available to one of ordinary skill in the art, to modify a prior art reference or combine two or more prior art references. Second, the Examiner must show a reasonable expectation of success in making this combination or modification. Third, the Examiner must show that the combination or modification, if proper, contains all of the elements of the application under examination. If any of these elements are not met, the Examiner has failed to establish a successful *prima facie* case of obviousness. It is respectfully asserted that the Examiner has failed to show that any combination of Fan and Go, or any modification of Go, or any combination of Go with well-known prior art or with the Schreiber patent contains all of the elements of the rejected claims. Using an example given in the previous response, the edge detection methods disclosed by Fan and Go, as

compared to the claimed subject matter, are materially different. Go discloses a sum of differences approach, as stated on col. 6, line 66, to col. 7, line 23. This method disclosed by Go is applied to both the horizontal and vertical directions individually. Conversely, the detailed description of the present application, page 7, line 14 to page 8, line 15, discloses multiple methods for edge detection that may be used in accordance with the claimed subject matter, none of which employ the approach of Go.

Additionally, as stated in arguments presented above, the video encoder disclosed in Go performs several additional and differing processing steps not required in the rejected claims. Go discloses a method of image encoding where the image is sent to an edge detector, and the image is additionally sent to both a filtering process and a down sampling process, resulting in coding and subsequent transmission being performed on representative filtered and down sampled data, rather than on the image. Conversely, as illustrated in FIG. 1 of the present application, the frame is coded without performing these additional process steps and the frame is the object that is coded rather than the reduced image R as disclosed in the cited patent. There is no contemplation of requiring a filtering and down sampling process for the frame that is to be coded, and the frame itself is coded in the present application, rather than the reduced image information R, as disclosed in Go. It is, therefore, respectfully that asserted that the Examiner has failed to establish a *prima facie* case of obviousness, specifically there is not showing that the combination or modification, if proper, contains all of the elements of the rejected claims. At least one element, as stated herein, is missing from each of the alleged combinations.

Additionally, the methods disclosed for frame and edge information coding as disclosed in reference to the rejected claims are materially different than the method disclosed in the Go patent, and similarly there appears to be no mention of methods for frame and edge detection in the Fan patent, or the Schreiber patent, that are even analogous to at least one method disclosed in the present application. Even if the Fan patent did disclose an edge sensitive post filter that could be modified to operate with the method disclosed in Go, although applicants have serious doubts concerning the operability of this combination, there still would be several elements not met by the combination. As stated previously, Go discloses a method of edge detection and frame encoding

wherein the method used for image decoding is dependent upon the detection and use of edge information in the encoding process. The process disclosed in Go essentially describes a method of decoding where several edge maps produced during the encoding process are passed through smoothing and down sampling filters, and are then passed through edge synthesizers to produce several partially reconstructed images of the edges of the original image passed through the encoder. These edge maps, along with the reduced image information, are then supplied to an inverse wavelet transform processor, where the images are added together to produce a decoded image. The image cannot be reconstructed without use of extensive edge information, and the image information transferred is reduced image information R, that provides inadequate image information to fully decode the image. Therefore, even if this method were combined with that disclosed by Fan, it still would be a fundamentally different use of edge information, and a materially different method of image decoding that requires the use of edge information rather than making it optional as in at least one embodiment of the claimed subject matter.

Finally, there is no contemplation in either Fan or Go to transmit image data and edge detection data separately, or to compress or code image data and edge detection data separately, as disclosed and claimed by Applicants. It is conceded by the Examiner that the combination of Fan and Go discloses a method of transmission where the image data and edge detection data is multiplexed prior to transmission. Quoting from Go, column 6, lines 9-14, "The multiplexer 26 combines the reduced image information Cr and edge image information Cs into an encoded image C, which is output to a first input/output device 28 ..." Conversely, quoting from the present application, page 10, lines 6-12, "Although the invention is not limited in this respect, it is envisioned that an edge detection map may be transmitted as supplemental signal information corresponding to a coded video frame. Therefore, at the far or receiving end of the communications channel, depending on the capabilities of the decoder, this edge detection map may or may not be employed to enhance the decoded video frame, as described in more detail in the embodiment below. Likewise, in addition to transmitting one edge detection map, in alternative embodiments, multiple edge detection maps may be transmitted, as previously indicated." As can be seen from these excerpts, there is no contemplation in the cited

patents to compressing or transmitting edge image information separately from image information, and therefore, an element of the claimed subject matter is not present in the cited patents. The Examiner has cited the Schreiber patent for support concerning the transmission of edge information and image information separately. It is respectfully asserted that even if there was a successful combining of Go and Schreiber, although applicants doubt the ability to do so, there still would be elements of the rejected claims not met by the combination, as described in detail previously.

It is, therefore, respectfully asserted that the Examiner has failed to meet at least one prong of the three-prong test for obviousness, and has therefore failed to establish a prima facie case of obviousness under section 103 of the patent statute. It is, therefore, respectfully asserted that claims 5, 9-10, 15, 17-18, 24, 25 and 27-29 are in a condition for allowance.

CONCLUSION

In view of the foregoing, it is respectfully asserted that all claims pending in this application are in condition for allowance. If the Examiner has any questions, he is invited to contact the undersigned at (503) 264-9427. Reconsideration of this patent application and early allowance of all the claims is respectfully requested.

Respectfully submitted,

Dated:

Michael J. Willardson
Patent Agent
Reg. No. 50,856

c/o Blakely, Sokoloff, Taylor & Zafman, LLP
12400 Wilshire Blvd., Seventh Floor
Los Angeles, CA 90025-1026
(503) 264-0967

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to Commissioner of Patents, Washington, D.C. 20231 on:

November 8, 2002
Date of Deposit

Angie C. Farr
Name of Person Mailing Correspondence

Angie C. Farr 11.8.02
Signature Date

INDEX OF PENDING CLAIMS

1. A video processor system comprising:

a video coder, the video coder including the capability to generate an edge detection map along a predetermined direction for an uncoded frame that is to be coded, wherein said video coder includes the capability to compress the edge detection map, wherein said video coder includes the capability to compress the edge detection map separately from said frame that is to be coded.

3. The video processing system of claim 1, wherein the predetermined direction comprises one of the vertical and horizontal direction.

4. The video processing system of claim 1, and further comprising a video decoder.

5. The video processing system of claim 4, wherein the video decoder includes an edge-sensitive post-filter, the edge-sensitive post-filter including the capability to enhance a decoded video frame based, at least in part, on a decoded edge detection map associated with the decoded frame.

6. A video processing system comprising:

a video frame processor to generate an edge detection map from an uncoded video frame to be coded, the video frame processor further including the capability to code the edge detection map.

7. The video processing system of claim 6, wherein the video processing system includes the capability to code the edge detection map for transmission via a communications channel along with an associated video frame.

8. The video processing system of claim 6, wherein the video processing system includes the capability to code the edge detection map for transmission via a communications channel separately from an associated video frame.

9. The video processing system of claim 6, wherein the video processing system includes the capability to code the edge detection map for storage along with an associated coded video frame.

10. The video processing system of claim 6, wherein the video processing system includes the capability to code the edge detection map for storage separately from an associated coded video frame.

11. A method of processing a video frame comprising:

producing an edge detection map along a predetermined direction from the video frame prior to coding;

coding the edge detection map and the video frame.

12. The method of claim 11, wherein the predetermined direction comprises one of a horizontal direction and a vertical direction.

13. The method of claim 11, wherein producing an edge detection map includes producing more than one edge detection map along more than one direction; and

wherein coding includes coding the more than one edge detection map.

14. The method of claim 13, and further comprising:

decoding the coded edge detection maps and video frame.

15. The method of claim 14, wherein decoding includes applying an edge-sensitive post-filter, the edge-sensitive post-filter including the capability to enhance a decoded video frame based, at least in part, on decoded edge detection maps associated with the decoded frame.

16. The method of claim 11, and further comprising:

decoding the coded edge detection map and video frame.

17. The method of claim 16, wherein decoding includes applying an edge-sensitive post-filter, the edge-sensitive post-filter including the capability to enhance a decoded video frame based, at least in part, on a decoded edge detection map associated with the decoded frame.

18. The method of claim 17, and further comprising: storing the coded video image and edged detection map before decoding.

19. The method of claim 17, and further comprising: transmitting the coded video image and edge detection map via a bandwidth limited communications channel prior to decoding.

20. An article comprising: a storage medium having stored thereon instructions capable of being executed by a system that when executed result in:

producing an edge detection map along a predetermined direction from the video frame prior to coding;

coding the edge detection map and the video frame.

21. The article of claim 20, wherein the predetermined direction comprises one of a horizontal direction and a vertical direction.

22. The article of claim 20, wherein producing an edge detection map includes producing more than one edge detection map along more than one direction; and

wherein coding includes coding the more than one edge detection map.

23. The article of claim 22, and further comprising:

decoding the coded edge detection maps and video frame.

24. The article of claim 23, wherein decoding includes applying an edge-sensitive post-filter, the edge-sensitive post-filter including the capability to enhance a decoded video frame based, at least in part, on decoded edge detection maps associated with the decoded frame.

25. The method of claim 23, wherein decoding includes applying an edge-sensitive post-filter, the edge-sensitive post-filter including the capability to enhance a decoded video frame based, at least in part, on decoded edge detection maps associated with the decoded frame.

26. The method of claim 20, and further comprising:

decoding the coded edge detection map and video frame.

27. The method of claim 26, wherein decoding includes applying an edge-sensitive post-filter, the edge-sensitive post-filter including the capability to enhance a decoded video frame based, at least in part, on a decoded edge detection map associated with the decoded frame.

28. The method of claim 27, and further comprising: storing the coded video image and edged detection map before decoding.

29. The method of claim 27, and further comprising: transmitting the coded video image and edge detection map via a bandwidth limited communications channel prior to decoding.